

CLAIMS

1. A polypeptide which is a flavin-containing monooxygenase 3 (FMO3), wherein said FMO3 is a polypeptide comprising at least a sequence having at least 85% identity with the
5 polypeptide sequence SEQ ID NO: 15.
2. A polypeptide according to claim 1, which polypeptide is a functionally altered mutant of flavin-containing monooxygenase 3 (FMO3) leading to a buildup of trimethylamine in an
10 animal.
3. A polypeptide according to claim 2 resulting from a deletion, insertion, non-sense, or mis-sense mutation in a FMO3 gene.
4. A polypeptide according to claim 3 which is the R238X variant of the bovine FMO3.
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5. An isolated nucleic acid sequence encoding a polypeptide according to any of claims 1-4, or the complement thereof.
6. An isolated nucleic acid sequence according to claim 5 which is the nucleic acid
20 sequence shown in SEQ ID NO: 14.
7. An isolated nucleic acid sequence comprising at least a portion of a nucleic acid sequence encoding a polypeptide of any of claims 1-4, and up to 500 kb of a 3' and/or a 5' adjacent genomic DNA sequence, or the complement thereof.
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8. A nucleic acid fragment selected from the group consisting of;
 - a specific fragment of a nucleic acid sequence encoding a polypeptide according to any of claims 1-4,
 - a nucleic acid fragment which specifically hybridises under stringent conditions with a
30 nucleic acid sequence encoding a polypeptide according to any of claims 1-4,
 - a specific fragment of a nucleic acid sequence according to claim 7,
 - a nucleic acid fragment which specifically hybridises under stringent conditions with a nucleic acid sequence according to claim 7,
 - SEQ ID NO: 9,
 - 35 - SEQ ID NO: 10,
 - SEQ ID NO: 11,
 - SEQ ID NO: 12,
 - SEQ ID NO: 16,

- SEQ ID NO: 17, and
- SEQ ID NO: 18.

9. A set of primers for amplifying a nucleic acid sequence according to any of claims 5-7,
5 comprising at least one primer selected from the group consisting of the nucleic acid fragments according to claim 8.

10. A method for detecting a mutation in the *FMO3* gene of an animal where the mutation will cause an alteration in the metabolism of trimethylamine leading to a fish off- flavour in
10 a food product of the animal or its offspring, wherein the method comprises:

- obtaining a sample of genomic DNA from the animal,
- amplifying a segment of said DNA spanning a polymorphic marker by PCR using a set of primers according to claim 9, and
- detecting in said amplified DNA the presence of an allele of a polymorphic marker
15 associated with said mutation in the *FMO3* gene.

11. A method for detecting a nucleic acid sequence comprising a mutation in the *FMO3* gene of an animal where the mutation will cause an alteration in the metabolism of trimethylamine leading to a fish off- flavour in a food product of the animal or its offspring,
20 wherein the method comprises:

- obtaining a nucleic acid sample from the animal;
- determining the presence in said nucleic acid sample of a nucleic acid sequence encoding a mutated *FMO3* polypeptide.

25 12. A method for detecting a nucleic acid sequence according to claim 11, wherein said nucleic acid sequence is detected by

- contacting said nucleic acid sample with a nucleic acid probe spanning said mutation under conditions of specific hybridisation between said probe and the mutant sequence to be detected; and
- 30 - detecting the hybridisation complex.

13. A method according to claim 11 or 12 wherein the presence of the nucleic acid sequence encoding said mutant polypeptide is determined by contacting the nucleic acid sample with a nucleic acid fragment according to claim 8.

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14. A method according to claim 11 or 12 which further comprises PCR amplification from the nucleic acid sample, of a sequence comprising at least the portion of the *FMO3* sequence wherein the mutation is to be detected.